



# Chapter Sixty-Five

## COST ESTIMATING

BUREAU OF DESIGN AND ENVIRONMENT MANUAL







**Chapter Sixty-Five**  
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# CHAPTER SIXTY-FIVE

## COST ESTIMATING

To adequately define the project scope and to ensure sufficient construction funds are available, cost estimates are required during the various stages of project development. As the project progresses, the estimates are refined to ensure the project is still cost effective, sufficient funds are available for construction, and the contractor's bid price is reasonable. Chapter 65 discusses the various project estimates that are required and the responsibilities of the district and Central Office estimators.

### 65-1 PROJECT ESTIMATES

#### 65-1.01 Project Initiation Estimate

The districts and other units are responsible for nominating projects to be included on the Department's Multi-Year Highway Improvement Program. Once a project is nominated, the Office of Planning and Programming is responsible for gathering the necessary information on the project before it can be included on the Program list. One part of this information gathering includes a preliminary cost estimate for construction. These cost estimates are prepared in cooperation with the District Programming Engineer and/or Estimating Engineer.

Once a project has been included on the Department's Multi-Year Program, it may be several years before a Phase I study can be conducted. Consequently, the project initiation cost estimate must be updated annually until the Phase I study has been conducted.

At the time of project initiation, detailed project quantities have not yet been developed. The programmer will determine the estimate based on information provided periodically by the estimator, by using broad units of cost (e.g., cost per mile (kilometer), cost per square yard (square meter)), and by reviewing similar, recent projects in the area. Project initiation cost estimates are generally determined according to the following:

1. Roadway Projects. For most highway projects, assume a cost per mile (kilometer) per roadway width. This estimate includes the cost for earthwork, pavement structures, drainage, and other miscellaneous items. Every effort should be made to include all anticipated work items.
2. Structure Projects. For most structural projects, assume a cost per square foot (square meter) based on similar structure types and lengths.



3. Traffic Signal Projects. Estimate traffic signal projects assuming a per intersection installation.
4. Unit Costs. If sufficient quantities are available, use the quantities with the average weighted unit prices to develop the estimate. Add a factor of 10 to 20 percent to account for minor items.

In addition, the programmer should add the cost for any major features that are beyond the basic assumptions used to develop the estimate. For example, the cost for a major box culvert should be added to the roadway cost per mile (kilometer) estimate.

Based on the proposed scope for the project, the programming engineer will determine the unit cost basis considering the following factors:

- geographic location (e.g., urban/rural, State location, district);
- similarity of recent construction projects;
- inflation (adjustments of past prices to reflect the current year);
- reliability of recent construction cost data;
- recent trends in cost of materials, labor, and equipment;
- anticipated difficulty of construction;
- project size relative to size of previous projects;
- proposed project schedule;
- anticipated construction staging;
- right-of-way;
- railroads;
- utilities;
- expected environmental problems (e.g., hazardous wastes, wetlands); and
- engineering judgment.

#### **65-1.02 Phase I Estimate**

Once the Phase I study has been completed, the District Programming Engineer with input from the Estimating Engineer will work with the Office of Planning and Programming to prepare a more detailed cost estimate for the Phase I report. The programmer and/or estimating engineer preparing the estimate will use the quantities determined during the study. If quantities are not available, the designer should be requested to develop these quantities. If quantities are unavailable and cannot be estimated in a reasonable time frame, use the estimating procedures described in Section 65-1.01 (e.g., cost per mile (kilometer)). For consultant projects, the consultant will develop the quantities and determine the unit prices. Department personnel will review and may adjust the consultant's proposed unit prices.



Figure 65-1A lists those elements for which cost estimates should be developed for a Phase I report for complex projects such as reconstruction or new alignments. Typically, at this stage, not all of the quantities have yet been determined. The designer may include a 10 to 20 percent contingency factor depending upon engineering judgment for the minor items. Section 65-2 discusses the procedures for developing cost estimates based on quantities. Chapter 12 provides additional information on estimating procedures for Phase I reports. To adequately reflect construction and programming options, it may be necessary to use multiple columns on the estimate form or multiple estimate forms to show the costs for the various alternatives, segments, local participation, and construction breakdowns. In determining the breakdowns, the designer should consider the following:

1. Major Items. List the individual major elements separately (e.g., interchanges, bridges) and clearly identify their location on the estimate.
2. Rehabilitation Projects. On rehabilitation projects, breakdowns may be required for certain construction items because of the potential for specific items to become major project costs.
3. Two or More Construction Seasons. On major projects that will require more than one construction season to complete, break the project into individual segments which can be completed in one season.
4. Project Funding. Identify construction, right-of-way, utility adjustments, local participation, and consultant PE costs separately to facilitate programming of these items.

Figure 65-1B is a cost estimate that should be developed for simple projects such as 3R, widening, resurfacing, etc.



Date: \_\_\_\_\_  
 Route: \_\_\_\_\_  
 Section: \_\_\_\_\_

Designer: \_\_\_\_\_  
 City/County: \_\_\_\_\_  
 Base Year: \_\_\_\_\_

WORK CLASSIFICATION	Estimated Costs in \$1000's					
	Segments					Totals
	1	2	3	4	5	
1. Clear and Grub (Minor removal items and demolition)						
2. Earthwork						
a. Mainline grading and drainage (minor structures)						
b. Frontage road grading and drainage (minor structures)						
3. Pavement						
a. Mainline subbase, base, surface, and shoulders						
b. Frontage road, subbase, base, surface, and shoulders						
4. Grade Separations						
a. Railroads						
b. Highway grade separations, including earthwork and pavement (without ramps). List each separately.						
c. Structure removal						
5. Interchanges (structure, crossroad and ramp earthwork, crossroad and ramp pavements). List each separately. (Do not include mainline grading or pavement.)						
6. Structures						
a. Drainage (major structures)						
b. Walls (retaining or reinforced earth)						
7. Miscellaneous Items						
a. Guardrail, fencing, and lighting						
b. Traffic control						
c. Traffic signals (modernization or new)						
d. Signing						
e. Railroad Crossing Improvements						
f. Field Office and Laboratory						



WORK CLASSIFICATION	Estimated Costs in \$1000's					
	Segments					Totals
	1	2	3	4	5	
8. Other Items						
a. Erosion Control						
b. Landscaping						
c. Rest areas or other amenities						
d. Environmental mitigation						
9. Traffic Management Costs						
a. Crossovers						
b. Temporary roadways						
c. Detours						
10. Subtotal (Categories 1 – 9)						
11. Contingencies (____% of Line 10). (Should not exceed 20%).						
12. Total Construction Cost (Lines 10 and 11)						
13. Right-of-Way						
a. Residential property and relocations						
b. Farm and business property and relocations						
14. Utility Adjustments						
15. *Preliminary Engineering (____% of Line 12)						
16. *Construction Engineering (____% of Line 12)						
17. Total Project Cost (Lines 12 - 16)						
18. Local Participation						

*Note: \*If consultant work is anticipated for preliminary engineering or construction engineering, these items should be listed separately in submission of costs for programming purposes.*

**COST ESTIMATE FORMAT**  
**(Complex Projects)**  
**Figure 65-1A**  
 (Continued)



Date: \_\_\_\_\_  
 Route: \_\_\_\_\_  
 Section: \_\_\_\_\_

Designer: \_\_\_\_\_  
 City/County: \_\_\_\_\_  
 Base Year: \_\_\_\_\_

WORK CLASSIFICATION	Estimated Costs in \$1000's
1. Clearing; Minor Removal Items	
2. Earthwork	
3. Erosion Control	
4. Drainage	
5. Subbase, Base, Surface, Shoulders	
6. Guardrail, Roadside Safety	
7. Traffic Signals	
8. Detours, Temporary Traffic Control - Roadway	
9. Railroad Crossing Improvements	
10. Field Office and Laboratory	
11. Environmental Mitigation/Incidental Items	
12. Roadway Subtotal (Categories 1-11)	
13. Structure Removal	
14. Major Culverts	
15. Bridges	
16. Structures for Detours and Temporary Traffic Control	
17. Structure Subtotal (Categories 13-16)	
18. Roadway and Structure Subtotal (Lines 12 and 17)	
19. Contingencies (___% of Line 18) (should not exceed 15%)	
20. Total Construction Cost (Lines 18 and 19)	
21. Utility Adjustments	
22. Land Acquisition and Relocations	
23. *Preliminary Engineering (___% of Line 20)	
24. *Construction Engineering (___% of Line 20)	
25. Total Project Cost (Lines 20 - 24)	

*Note: \*If consultant work is anticipated for preliminary engineering or construction engineering, these items should be listed separately in submission of costs for programming purposes.*

**COST ESTIMATE FORMAT**  
**(Project Reports)**  
**Figure 65-1B**



**65-1.03 Phase II Estimates**

One or more cost estimates may be prepared during the Phase II project stage. These estimates may include the following:

1. Preliminary Plan Review. At this project stage, a revised cost estimate is generally developed only to determine the appropriate preliminary Disadvantaged Business Enterprises (DBE) requirements. Recommended guidelines for DBE determinations are provided by the Division of Highways and the Office of Finance and Administration. Under some circumstances, a preliminary plan cost estimate may be prepared to ensure that the program funding is still reasonable and appropriate. At this stage, the plans and major quantities are essentially complete. Therefore, the estimate can be prepared using the methodologies discussed in Section 65-2 (i.e., based on unit prices). The designer will work with the District Estimating Engineer to develop this estimate. Do not forward this estimate to the Project Management Unit in the Bureau of Design and Environment.
2. Project Scope Change. Whenever the scope of the project changes, the designer will be responsible for obtaining a new construction cost estimate. These estimates are forwarded to the Office of Planning and Programming to revise the Multi-Year Program. Estimates for scope of work changes are typically based on approximate quantities and are determined using the procedures discussed in Section 65-1.02.
3. Project Delay. If there has been a significant delay in the project since it was originally designed and estimated, it may be necessary to update the cost estimate to reflect inflation, new materials, new equipment, contractor work loads, etc.
4. Final Plan Submittal. Prior to submitting the plans to the Central Office for letting, the District Estimating Engineer will prepare a cost estimate based on the final plans. This may be an update of an earlier cost estimate or, for many projects without a Phase I report, this estimate will be the first detailed estimate for the project. This estimate is forwarded to the Project Management Unit in the Bureau of Design and Environment, which will use it to develop the Engineer's Estimate.
5. Engineer's Estimate. The Engineer's Estimate is the official Department estimate for the project. This estimate is prepared by the Project Management Unit in the Bureau of Design and Environment based on the District Estimating Engineer's estimate. Section 65-1.04 discusses the procedures for the Engineer's Estimate.

**65-1.04 Engineer's Estimate**

The Engineer's Estimate will provide the Department with a basis for evaluating the bids for highway construction and will allow the Department to determine if the low bid price is fair and reasonable for the work involved. This estimate, plus the data used to generate the estimate, is



considered confidential and is not for general distribution. Section 65-2 discusses the procedures for developing the actual cost estimate. The following sections discuss the responsibilities of the various units for the Engineer's Estimate.

#### **65-1.04(a) Originating Unit**

Base cost estimates are prepared by the various units where the design originated (e.g., district, county, municipality, consultant). These estimates are submitted to the Engineer of Project Management in the Bureau of Design and Environment for final review and adjustment prior to contract letting. The originating estimator will generally prepare the final plan submittal estimate as discussed in Section 65-2. The originating estimator's responsibilities will include the following:

1. Quantities. The estimator will be responsible for inputting all quantities into the Bureau of Design and Environment's Contract Management System (ECM).
2. Unit Prices. The estimator will adjust the unit prices according to the procedures discussed in Section 65-2.
3. Worksheets. The estimator will prepare all estimates submitted to the Central Office on the worksheets provided in the ECM System and the *Estimates Manual*.
4. Data Input. The estimator must input all data into the ECM System prior to the PS&E date, or the project may not be scheduled for the anticipated letting.
5. Local Projects. For local road and bridge projects, the district estimator will review the local agency estimate and prepare a district estimate. This may be, but is not required to be, an independent estimate. If the difference between the local agency's estimate and district estimate is 1 percent or less, enter both estimates into the ECM System. If the difference is greater than 1 percent, contact the local agency and negotiate an acceptable estimate to both parties. If an agreement cannot be reached, notify the Engineer of Project Management. Enter both the district's and local agency's final estimates into the ECM System.
6. Submittals. When submitting the estimate data to the Central Office Project Management Unit, the estimator should note the following:
  - a. Data Transfer. Submit all estimates electronically to the Central Office through the ECM System. In addition, send a hard copy of the backup data and worksheets to the Central Office before the PS&E due date.
  - b. Approval. All cost estimates must be approved and signed-off by a certified estimator or a certified estimator-in-training before they can be forwarded to the Central Office Project Management Unit.



7. Revisions. If, after the estimate data has been submitted to the Central Office, the district estimator wishes to revise the estimate, the estimator must consider the following:
  - a. Review. Conduct all reviews of the data on-line through the ECM System. The estimate in the ECM System should always be the latest copy of the estimate.
  - b. Changes. If an estimate quantity, pay item, and/or unit price is changed on-line, notify the Engineer of Project Management, by fax, that a change has been made. The Central Office may be unaware of the change, because on-line changes are nearly impossible to identify.
  - c. Due Date. Do not change any estimate on-line less than eight days prior to the letting. If a change is necessary, contact the Engineer of Project Management directly to discuss the change.

The Engineer of Project Management must be notified of any changes to ensure the latest data is transferred to the Department's Letting Management (ELM) System.

#### **65-1.04(b) Central Office Project Management Unit**

After the district submits a cost estimate to the Engineer of Project Management, the Unit responsibilities include the following:

1. Review. The estimator will review the district's estimate and check it for errors and/or omissions. If large discrepancies are noted, the Engineer of Project Management will contact the district estimator to discuss and resolve any differences. The Central Office estimator will not review every project cost estimate. For these situations, the district estimate will be used as the Engineer's Estimate. However, the Engineer of Project Management will still have final authority for all estimates. Typically, the following estimates will not be reviewed by the Central Office:
  - a. Projects < \$250,000. For all projects less than \$250,000, the estimates prepared by certified district estimators will be used without review.
  - b. Lighting and Pumping Station Projects. All lighting and pumping station projects from the District 1 Bureau of Electrical Operations which are less than \$250,000 will be used without review. For lighting and pumping station projects from Districts 2 through 9, the Electrical and Mechanical Unit in the Bureau of Design and Environment will be responsible for reviewing the estimate.
  - c. Local Agency Projects. Local agency estimates may not be reviewed.



- d. Bridge Projects. For all bridges designed by the Bureau of Bridges and Structures and/or Department consultants, the Bridge Office will review the estimate for bridge items.
  - e. Bureau of Operations Projects. Estimates prepared by the Central Office Bureau of Operations may be used without review.
2. Opening and Processing the Bids. After the public reading of the bids, the Project Management Unit is responsible for checking the proposals for errors and obtaining computer printouts of itemized unit bid prices. The bid prices of each bidder are reviewed for omissions or extreme differences. If no extreme differences appear, the low bidder meets all criteria and the low bid is within a pre-established award range, the bids are forwarded to the Pre-Award Committee for approval.
3. Rejection of Bids. When the low bid exceeds the pre-established award range, the estimate is reviewed for possible errors. If no errors are found, the rejection process begins, unless special circumstances such as public safety, etc., would be just cause for award.

#### **65-1.04(c) Pre-Awards Committee**

Upon receiving the recommendations of the Engineer of Project Management for award or rejection of the bids, the Pre-Awards Committee will meet to review all bids. The Committee will forward their recommendation to the Awards Committee. The Pre-Awards Committee consists of the following personnel:

- Engineer of Design and Environment,
- Engineer of Project Management,
- Engineer of Project Development and Implementation,
- representative of the Federal Highway Administration,
- representative of the Bureau of Construction,
- representative of the Bureau of Local Roads and Streets, and
- Proposals and Contracts Subunit Chief.

#### **65-1.04(d) Awards Committee**

The Awards Committee is responsible for approving or rejecting the bid. This Committee consists of the following personnel:

- Deputy Director of Program Development,
- Engineer of Design and Environment,
- Engineer of Construction, and



- Engineer of Project Management.

At the conclusion of the Awards meeting, the Engineer of Project Management prepares the official bid letting tabulation and the award memorandum for submittal to the Secretary.







## 65-2 DISTRICT ESTIMATING PROCEDURES

### 65-2.01 Responsibilities

#### 65-2.01(a) Designer Responsibilities

Before a detailed cost estimate can be prepared, the designer will typically provide the following information to the District Estimating Engineer:

1. Plans. Provide the estimator with a complete set of plans.
2. Quantities. In addition to providing quantities to the estimator, the designer must provide the following:
  - a. Breakdowns. For those projects with separate breakdowns, separate the quantities for each breakdown category (e.g., construction and safety codes, funding appropriations). These breakdown categories are discussed in Section 63-4.04.
  - b. Lump Sum Items. Provide the estimator with a summary of the individual items within the lump sum item. For example, the list of elements for the lump sum pay item "Traffic Control and Protective Standards" may include the number of barricades, barricade lights, construction signs, arrow boards, temporary guardrail, temporary signals, pavement marking tape, etc.
3. Specifications. Provide the estimator with a copy of the special provisions and a list of all recurring special provisions used in the project.
4. Other Cost Estimates. Several bureaus and sections may prepare their own cost estimates. The designer is responsible for collecting these estimates and forwarding them to the appropriate District or Central Office Estimating Engineer. The following bureaus or sections may develop their own cost estimate:
  - a. Bureau of Bridges and Structures. The Bureau of Bridges and Structures may provide the cost estimates for bridges, retaining walls, major drainage structures, or any other work designed by the Bureau.
  - b. Bureau of Operations. The Bureau of Operations may provide cost estimates for traffic signals, traffic surveillance, signing, pavement markings, and landscaping projects.
  - c. District 1, Bureau of Electrical Operations. The Bureau of Electrical Operations in District 1 will provide the cost estimates for lighting and pumping stations.
  - d. Other. Other units may provide cost estimates as appropriate.



5. Other. Provide the estimator with any other information that may impact the cost of the project (e.g., special commitments, experimental materials).

#### **65-2.01(b) Estimator Responsibilities**

The District Estimating Engineer will review the information received from the designer and develop a cost estimate for the project. These estimates are generally formulated using the analyses discussed in Section 65-2.02 and the Department's ECM System. For estimates other than the Engineer's Estimate, the District Estimating Engineer will return the proposed estimate to the requesting party. For the Engineer's Estimate, the District Estimating Engineer will follow the procedures in Section 65-1.04(a).

If for some reason there are project changes after letting, the contractor will request reimbursement for the item at a unit cost. The district Bureaus of Project Implementation and/or Program Development may request the District Estimating Engineer to review the contractor's proposal to ensure that the unit cost is reasonable. This review will typically be conducted in the same manner as reviews for other estimates.

#### **65-2.02 Unit Cost Determinations**

The Department uses the Contract Maintenance (ECM) System and the *Estimates Manual* for developing and managing Department cost estimates. Note that the "E" is for coding purposes denoting the Bureau of Design and Environment. Worksheets are used to determine the cost estimate. These worksheets are included in the ECM System, *Estimates Manual*, and on Excel spreadsheets. Cost estimates are typically based on the quantities and applicable unit prices. The following sections discuss the basic procedures the Department uses to determine the applicable unit cost for each quantity. The estimator may adjust these procedures depending upon the project parameters. Both the *Estimates Manual* and the ECM System are for internal Department use and are not for general distribution.

##### **65-2.02(a) Historical Data**

The unit cost for minor work items will be based upon an average price database maintained by the Department within the ECM System, price books, and unit cost bid tabulations. Adjustments to this database may be appropriate based on the factors listed in Section 65-1.01.

The following work types are typically considered minor; i.e., the estimator should use the historical data methodology to determine the unit prices:



- lighting;
- traffic signals;
- signing;
- weed spraying;
- crack routing;
- pavement marking (all types);
- guardrail;
- signing, guardrail maintenance;
- landscaping;
- pipe culverts;
- pipe underdrains and pipe drains;
- manholes, catch basins, inlets, etc.;
- marine construction;
- curb and gutter;
- sidewalk;
- driveway pavement;
- electrical maintenance;
- bridge deck overlay;
- reinforcing steel;
- bridge approach pavement;
- riprap;
- soil stabilization;
- anchors and tiebacks;
- fencing;
- railroad track construction; and
- miscellaneous bridge items (e.g., bearings, deck grooving).

#### **65-2.02(b) Unit Cost Hybrid Worksheet**

For intermediate work items, calculate the unit costs using the Unit Cost Hybrid Worksheet in the *Estimates Manual*. An example for using this Worksheet would be to calculate the unit cost for Furnishing and Erecting Structural Steel (i.e., pounds (kilograms) of steel times dollars per pound (kilogram)). Section 65-1.01 lists several adjustment factors that should be considered when determining the final unit cost. The following are considered intermediate work types for which the estimator should use the Hybrid Worksheet:

- bridge painting,
- bridge cleaning,
- temporary support system, and
- structural steel.

#### **65-2.02(c) Unit Cost Detailed Worksheet**

For major work items and where these item quantities exceed the values in Figure 65-2A, the estimator should calculate the unit cost using the Unit Cost Detailed Worksheet in the *Estimates Manual*. For quantities less than those shown in Figure 65-2A, use engineering judgment to determine whether or not to use the Worksheet. The following are considered major work types for which the estimator should use the Detailed Worksheet:

- earth excavation, borrow, and embankment;
- concrete paving, widening, shoulders, and CAM II;
- bituminous paving, widening, shoulders, and BAM;
- aggregate base, shoulders, subbase, and surface;



- patching;
- cold milling;
- hauling;
- traffic control;
- seal coat;
- storm sewers;
- cofferdams;
- concrete structures and concrete box culverts;
- piling;
- structure removal; and
- sweeping.

The Unit Cost Detailed Worksheet requires the estimator to determine the unit prices based on the following factors:

1. Production Rates. The estimator must determine the appropriate production rates for the various items on the project. General production rates are provided in the ECM System detail worksheet. Section 66-2.02 also provides typical production rates. Stage construction, congestion, urban work, size of quantity, traffic, seasonal work, expedited work schedule, local restrictions, etc., all affect the production rate. The estimator should consult with district construction personnel, review Means' *Heavy Construction Cost Data*, review the values within the *Estimates Manual* and Section 66-2.02, and use engineering judgment when determining production rates.
2. Equipment. Equipment costs include ownership expenses to cover such items as depreciation, repairs, taxes, storage costs, fuel, oil, and grease. Equipment costs can be obtained from the *Rental Rate Blue Book for Construction Equipment, Volume I* published by Dataquest. To obtain any equipment costs not specified by Dataquest, other sources may include manufacturers of the equipment and the Means' *Heavy Construction Cost Data*.
3. Labor. Labor costs vary greatly throughout the State. The estimator must not only determine what types of crafts that will be required, but also the most efficient number of workers in each craft. In determining a unit cost for labor, the estimator must consider the efficiency of the local labor, their working agreements, fringe benefits, social security, workers compensation, guarantees of minimum working hours per week, show-up time clauses, liability insurance, and non-working conditions due to mechanical breakdowns or bad weather.

The labor rate used for Federal-aid projects must be at least equal to the Federal prevailing wage rate. The labor rate used for State projects must be at least equal to the Illinois prevailing wage rate. An exception is when the prevailing rates are not provided in a contract. Section 65-3.01 further discusses the wage rate determination.



Work Item	Minimum Quantity	
	US Customary	Metric
Earthwork	5,000 yd <sup>3</sup>	5,000 m <sup>3</sup>
Aggregate	4,000 tons	3,500 m tons
Bituminous Mixes	2,000 tons	2,000 m tons
PCC Pavement & Bases	5,000 yd <sup>2</sup>	4,000 m <sup>2</sup>
Cold Milling	20,000 yd <sup>2</sup>	17,000 m <sup>2</sup>
Class A Patching	400 yd <sup>2</sup>	350 m <sup>2</sup>
Class B Patching	400 yd <sup>2</sup>	350 m <sup>2</sup>
Class C Patching	600 yd <sup>2</sup>	500 m <sup>2</sup>
Class D Patching	600 yd <sup>2</sup>	500 m <sup>2</sup>
Concrete Box Culverts	150 yd <sup>3</sup>	150 m <sup>3</sup>
Concrete Superstructures	150 yd <sup>3</sup>	150 m <sup>3</sup>
Concrete Structures	150 yd <sup>3</sup>	150 m <sup>3</sup>
Storm Sewers	1,800 ft	550 m
Structure Removal	Anytime in excess of \$25,000 per structure	Anytime in excess of \$25,000 per structure
Cofferdams	Anytime in excess of \$25,000 per cofferdam	Anytime in excess of \$25,000 per cofferdam
Drive and Furnish Piling	2,000 ft	600 m

### MINIMUM QUANTITIES FOR UNIT COST DETAILED WORKSHEET

Figure 65-2A



4. Material. Contact the suppliers directly to obtain quotes for materials. The quoted prices are typically what suppliers hope to receive for their product. The final price the contractor will be required to pay will generally be lower due to competition and negotiations between the contractor and supplier. Such items as discounts for large quantities, early payment or extreme competition on a particular project may vary the final price. The estimator should adjust the quoted prices based on these factors, previous estimates, and engineering judgment.
5. Hauling. The hauling expense is based upon haul distance, truck capacity, load and unload time, driver wage and truck expense, and/or quoted hauling costs.
6. Incidental. Incidental costs cover any items which may or may not be addressed by a particular pay item in a contract. Incidental costs may include:
  - pay items included in other items by specification or special provision;
  - coordination with other contractors;
  - “tight” completion dates which demand double shifts;
  - payment of overtime;
  - winter construction;
  - congested work areas;
  - high elevation work;
  - hauling through heavy traffic, frequent railroad crossings, or traffic signals;
  - work not adaptable to the normal equipment used which results in manual labor or renting of special equipment;
  - location of plant sites, including costs of rental and renovation;
  - the season during which the work will be performed;
  - the cost of maintaining traffic including stage construction, flagmen, lights, and barricades; and
  - other outside agencies rules and regulations (e.g., OSHA, EPA).
7. Mobilization. Mobilization costs consist of preparatory work and operations necessary for the movement of personnel, equipment, supplies, and incidentals to the project site;



for the establishment of offices, buildings and other facilities necessary for work on the projects; and for all other work or operations which must be performed or costs incurred when beginning work on the project. Mobilization may include delivery and removal of all equipment utilized for a given type of work. This type of mobilization includes loading, unloading, set-up, delivery, and all necessary permits. When determining mobilization costs, the estimator needs to consider the following:

- the same piece of equipment may be utilized for different work types and should only be mobilized once, if practical;
  - the type of operation;
  - how often and when the equipment is used;
  - the types of equipment; and
  - multiple types of mobilization.
8. Overhead. Overhead costs are divided into two classes — general overhead and job overhead. General overhead costs are main office expenses away from the job site which include salaries and expenses for staff employees, office maintenance, office transportation, expenses of bidding on projects, local contributions to charities, dues to contractor's associations, interest charges on borrowed capital, and any other expenses considered a part of the firm's general costs of doing business. Job overhead costs include general job supervision, general job supervision expenses, and security. Overhead costs are calculated differently depending upon whether it is equipment, material, labor, or subcontractor work. These differences are defined in the *Estimates Manual*.
9. Profit. Profit mark-up is the amount of money a contracting company retains after it has completed a project and paid all costs for materials, equipment, labor, overhead, taxes, insurance, etc. Profit costs are calculated differently depending upon whether it is for equipment, material, labor, or subcontractor work (see the *Estimates Manual*).
10. Bond. Bond costs are a percentage mark-up of all costs associated with a project. This cost should include both bid bond and performance bond costs.

#### **65-2.02(d) Lump Sum Items**

When lump sum items appear in the contract, the designer should provide a list of the elements within the lump sum item. However, the estimator should also search the plans and special provisions to determine what materials, procedures, equipment, etc., are involved to construct



the item. The unit cost for the lump sum item is then determined by combining the cost for each of the individual items.

### **65-2.03 Other Duties**

The District Estimating Engineer is also responsible for the following:

1. Pavement Selection Cost Analysis. Providing the designer with the unit costs to be used in pavement selection cost analysis. If the pavement area exceeds 5000 yd<sup>2</sup> (4000 m<sup>2</sup>), unit cost sheets must be prepared.
2. Cost Studies. Conducting cost studies for other bureaus within the district, upon request.
3. Agreed Unit Prices. Reviewing agreed unit prices submitted by the Contractor to the district Bureau of Project Implementation and recommending acceptance or rejection.
4. Unit Price Tabulation of Bids. Obtaining a copy of the Unit Price Tabulations of Bids for all projects in their district. This information will be made available to the general public for review and should be maintained for the last three years.



### **65-3 CENTRAL OFFICE PROJECT MANAGEMENT UNIT**

The following discusses the duties and responsibilities of the Bureau of Design and Environment Project Management Unit. Section 65-1.04 discusses the Unit's responsibilities for the Engineer's Estimate.

#### **65-3.01 Wage Rate Tabulation**

The Project Management Unit is responsible for preparing a tabulation of wage rates for laborers, operating engineers, carpenters, concrete finishers, iron workers, etc. This tabulation includes the minimum hourly wage rates for these crafts for all Illinois counties, including the fringe benefits in the contract agreement. These rates are determined from contracts between the local unions. This tabulation is updated quarterly and distributed to all district estimators. The Project Development and Implementation Section is responsible for maintaining a file, by county, of the current wage rates. Contractors must pay the current prevailing wage rates and all subsequent changes.

A wage rate tabulation is required on all projects. When the advertisement for bids on any contract is for the construction of a project on the Federal-aid system, a wage rate determination is distributed to all bidders 10 days prior to the letting per agreement with the U.S. Department of Labor. When the advertisement for bids on any contract is for State-funded contracts, the wage rates are included in the proposal. Any prevailing wage rate changes for State-funded contracts will be included in the Service Bulletin for the contractor's information.

#### **65-3.02 Other Duties**

The Project Management Unit is responsible for the following:

1. Day Labor Projects. Separate estimates are prepared based upon the day labor guidelines and the guidelines of the Project Management Unit. These two estimates are compared to determine the cost effectiveness of day labor versus competitive public bidding.
2. Pavement Selection Cost Analysis. The Project Management Unit reviews the cost of the pavement structural items included in the pavement design study submitted by the district office to the Bureau of Design and Environment's Policy and Procedures Section. A detailed cost analysis is made of each structural pavement item submitted in the study. Corrections, if necessary, are made and the file returned to the Policy and Procedures Section.
3. Cost Studies. Cost studies within the realm of the Project Management Unit's expertise are conducted for all divisions and bureaus of the Department upon request.



4. Agreed Unit Prices. If the agreed unit prices initially negotiated between the district Bureaus of Project Implementation and Program Development are unacceptable to the Central Office Bureau of Construction, the Project Management Unit will review the unit prices and provide a recommendation to the Central Office Bureau of Construction.
5. Review Historical Data. The Project Management Unit conducts periodic reviews of the historical data to purge the ECM System of unrealistic unit prices, which would distort the averages.
6. Incoming Estimates. The Project Management Unit maintains a list of all incoming estimates showing the total cost and data received for use by other internal offices.
7. Price Trend Index. The Project Management Unit develops and maintains a price trend index of highway construction costs for Department use and for outside publications.
8. Oilgram Index. The Project Management Unit maintains an oilgram index for printing in the Service Bulletin. This index consists of the average price per gallon per quarter for diesel fuel and the average price per ton for bituminous material per week and per quarter.
9. Federal Highway Administration. The Project Management Unit submits a complete estimate to the Federal Highway Administration for all non-exempt Interstate projects as defined by the Oversight Committee. On exempt projects, only the total cost is submitted to the FHWA when Federal-aid is involved. However, the estimates should include fund type breakdowns and distances. As contracts are awarded, the Program Support Unit submits the Bid Price Data on FHWA Form PR-2 to the Federal Highway Administration.
10. Construction Breakdown. The Project Management Unit prepares unit price breakdowns by type of construction for each contract and submits it to the Bureau of Construction to enable them to determine the bidding capabilities.
11. Estimates Manual. The Engineer of Project Management is responsible for maintaining, updating, and distributing the *Estimates Manual*.
12. Research. The Engineer of Project Management is responsible for developing new methods of computing unit costs, training, and instructing personnel involved in the art of cost estimating. This may involve seminars with district estimators to instruct and inform the estimators of revised or new methods of estimating and to discuss new equipment, materials, and unit cost items.